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| C. IRVIN MCCLELLAND OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | EXAMINER BOYKIN, TERRESSA M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1711 | |

DATE MAILED: 10/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/517,761

Applicant(s)

YAMAGUCHI ET AL.

Examiner

Terressa M. Boykin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,9,10,13-19,21,24,26 and 29-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,9,10,13-19,21,24,26 and 29-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>12-23-4</u> . | 6) <input type="checkbox"/> Other: _____ |

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Claim Rejections - 35 USC § 112

Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 14, the recited "corn -type-" renders the claim indefinite since the addition of the word "corn-'type'....shape" to an otherwise definite expression extends the scope of the expression so as to render it indefinite. *Ex parte Conpenhaver*, 109 USPQ 118 (Bd. App. 1955) , additionally, it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d). Additionally, in this particular instance, the Examiner is also unsure of the meaning of a 'corn.... shape' object even without the recited indefinite language. In other words, are applicants referring to an oblong, or cylindrical figure etc.? Clarification and correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2,9,10,13-19,21,24,26, 29-34 are rejected under 35 U.S.C. 102(a, b, or e) as being anticipated by USP 3969470 cols. 1-6, figure 1 and claims 1, 11 and 12; or USP 5516818 see cols. 1-6, table 3 and claims 1-12; USP 6403761 see abstract, cols. 1-4 and figure 1.

USP 3969470 discloses a continuous process for recycling hydrogen for reuse in making blends of olefin copolymers of high and low molecular weights which comprises copolymerizing ethylene with at least one higher olefin monomer in a solvent in separate reactors in the presence of a coordination catalyst, at least one, but not all, of said reactors containing hydrogen in an amount sufficient to produce low molecular weight copolymer. The resulting solutions of high and low molecular weight copolymers are mixed, unreacted monomers and hydrogen are flashed from the mixture, and the copolymer blend is isolated from the unflashed residue. The flashed gaseous unreacted monomers and hydrogen are circulated together through a staged absorption column under superatmospheric pressure and simultaneously solvent is passed through said column in order to absorb monomer in the solvent and thus separate unabsorbable hydrogen gas from the monomers for recycle to a polymerization reactor in the system for making low molecular weight copolymer component.

Specifically, the reference discloses a method for the recovery of hydrogen by selectively recycling the hydrogen to one or more staged continuous polymerization reactors. Hydrogen is removed from the downstream reactor effluent in the staged absorption column and returned to the downstream reactor, only a small fraction being sent to the upstream reactor. Thus, a low hydrogen concentration can be maintained in the upstream reactor, so that high molecular weight copolymer is produced; at the same time a high concentration of hydrogen can be maintained in the downstream reactor so that the desired low

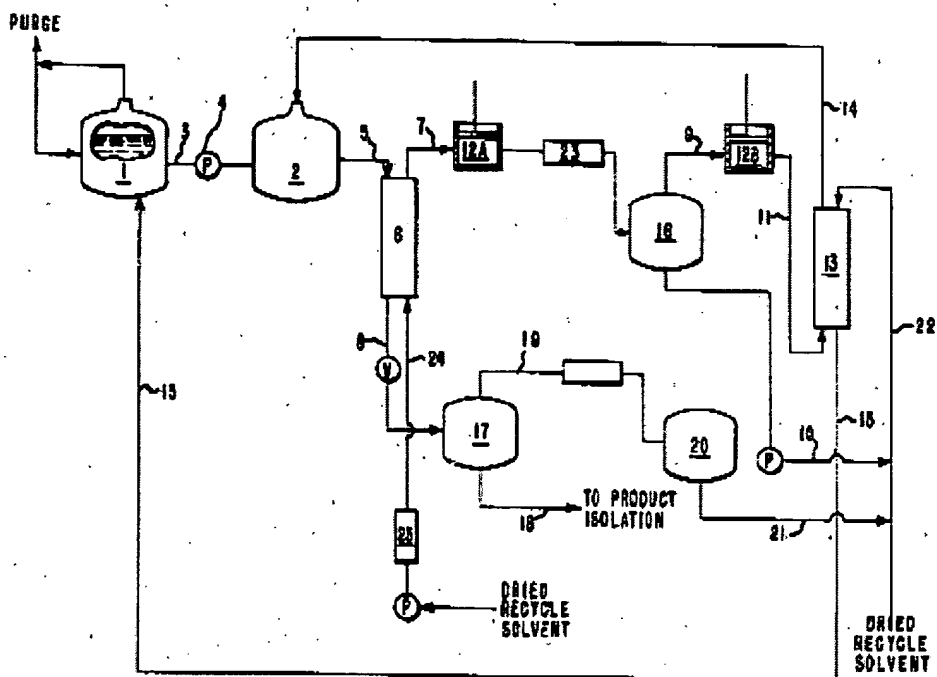
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molecular weight copolymer can be produced. At the same time the unreacted monomers can be recycled to the polymerization reactors in preselected amounts so that all important product composition is controlled without loss of monomer.

Copolymers prepared by copolymerizing ethylene with a higher olefin, e.g., propylene and, optionally, nonconjugated dienes, are well known commercial products. Efficient manufacture of these products requires a copolymer synthesis process which involves continuously feeding a coordination catalyst and monomers to a reactor having a liquid phase where copolymerization occurs, continuously removing a portion of this liquid (containing a mixture of copolymer, unreacted monomers, catalyst residue and solvent) in order to isolate the copolymer product, recovering unreacted monomers and solvent and recycling them to the reactor.

After the polymer blend is made it can be separated from unreacted monomers and hydrogen in a conventional manner by flashing, for example, in a stripper. However, a serious problem arises concerning reuse of hydrogen and unreacted monomers. Due to the large proportion of monomers in the resulting stripper off-gas mixture, one cannot split and recycle the gaseous mixture among the reactors in order to maintain the desired hydrogen concentrations in the liquid reaction zones and, at the same time, maintain the monomer concentration ratios desired therein. If the off-gas stream is split to apportion the hydrogen properly, incorrect monomer ratios result; if the stream is split to apportion the monomers properly, then hydrogen distribution is unsatisfactory. There is no practical or commercially feasible technique for apportioning the hydrogen in the off-gas stream to a reactor in which high molecular weight polymer is being made without first purging to the atmosphere most of the stripper off-gas stream being recycled, thereby losing not only hydrogen but substantial amounts of

increasingly scarce and expensive unreacted monomers. Accordingly, there is a need for a process in which hydrogen can be recovered and recycled in preselected concentrations to separate reactors to regulate molecular weight of the copolymer components of a blend and at the same time permit independent product composition control so that a preselected ratio of monomer units is contained in the copolymers.



The drawing depicts a representative process of the present invention illustrating two reactors in series with a common monomer recovery and recycle system. The concentration of hydrogen in the reactor liquid phase producing the low molecular weight copolymer is at least about three times greater than the concentration of hydrogen in the reactor liquid phase producing the high molecular weight copolymer. The monomers to be polymerized are added to evaporatively cooled reactor 1 together with the coordination catalyst, hydrogen,

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and solvent. The copolymerization reaction is conducted therein in a conventional manner and a solution of the resulting high molecular weight copolymer is circulated to liquid-full reactor 2 through line 3 by means of pump 4. While copolymerization is occurring in reactor 1, monomers, coordination catalyst, make up hydrogen and solvent are, at the same time, being independently fed through appropriate lines to upstream reactor 2, where copolymerization is also occurring in the presence of recycled hydrogen to produce the low molecular weight copolymer component needed to make a blend of copolymers. A solution of the resulting blend of high and low molecular weight copolymer is passed through line 5 to stripper 6 where unreacted monomers and hydrogen are removed as gases by contact with a hot gas stream flowing through line 24. The hydrogen and gaseous monomers are circulated via line 7 to a compressor and a series of condensers and thence to line 11 and into staged absorption column 13. The residual polymer blend, together with solvent and monomers, is removed as liquid through line 8 and after flashing in separator 17 (to remove some of the remaining monomers) is fed to a product isolation area via line 18. There the blend of polymers is separated from solvent in a conventional manner. Solvent is recovered, dried, and returned to a recycle solvent feed system applying solvent to stripper 6 (via line 24) and to staged absorption column 13 (via line 22). In the product isolation area (not depicted), the copolymer blend is dried and packaged.

It can be seen from a comparison between the working example and the control that an outstanding advantage of this invention is its efficient use of hydrogen, volatile monomers and solvent. Most important, the working example of the present invention illustrates that only 0.4 pound per hour of hydrogen is lost from the polymerization system. In contrast, in the control a loss of 8.7 pounds per hour of hydrogen occurs. Further, in the control process recycle of

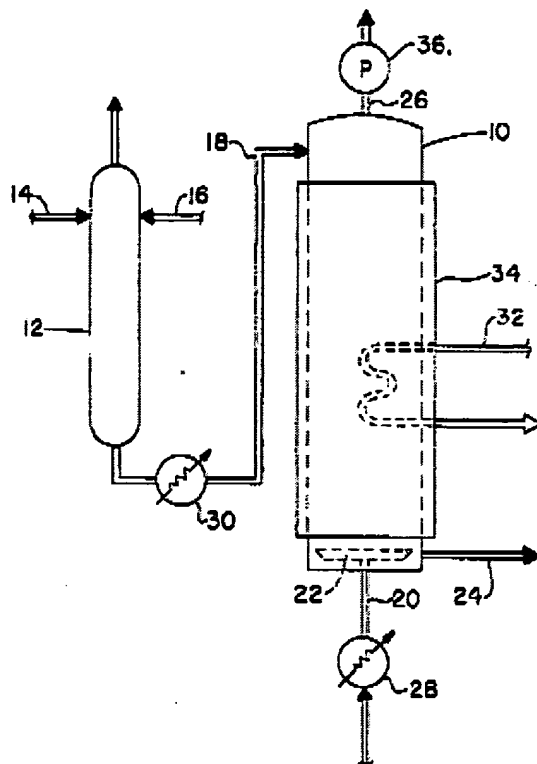
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monomer containing an excessive amount of hydrogen to either reactor cannot be done because the ratio of hydrogen is excessive for making high molecular weight copolymer, and the ratio of monomer is excessive for making low molecular weight copolymer. The stream containing hydrogen in the control must be vented in order to purge the unit so that high molecular weight copolymer can be produced and the hydrogen inventory in the entire system be held at steady state. Thus, not only hydrogen is lost, but also valuable volatile monomers and solvent.

US 5516818 discloses a process for achieving a significant reduction in the volatile organic compound content (VOC) of an aqueous polymerization system includes the steps of contacting the aqueous polymerization system with an organic solvent and allowing said organic solvent to be absorbed into polymer particles of said aqueous polymerization system, contacting said aqueous polymerization system and organic solvent with a gas or vapor at temperature and pressure conditions, which cause mass, transfer of the volatile organic compounds from said latex into said gas or vapor phase, and separating said gas or vapor from said aqueous polymerization system. The solvent is generally absorbed into the polymer particles of the latex and serves as a stripping aid, especially with respect to higher molecular weight compounds which tend to remain trapped in the polymer particles during conventional stripping processes. An important advantage of the invention is that it facilitates significantly enhanced VOC reduction using conventional stripping apparatus with only relatively minor modifications thereto. The improved stripping performance of

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the invention is achieved without any significant deleterious effect on colloidal stability, average polymer particle size, solids content or other important latex properties.



The process is described in detail with reference to FIG. 1 which is a schematic representation of a preferred apparatus for practicing the invention of the reference. The apparatus includes a stripping tower 10 which can be of any suitable design (preferably a packed or plate-type tower). In accordance with a preferred technique for practicing the method of the invention, the latex from which VOCs are to be removed is premixed with an organic solvent prior to being introduced into the stripping tower 10. The latex and organic solvent flow into the mixing vessel 12 through separate feed lines 14 and 16,

respectively. Mixing vessel 12 preferably includes means for agitating the latex and organic solvent, and is desirably of a suitable volume to provide an average residence time which is sufficient to ensure complete mixing of the latex with the organic solvent. Most preferably, the mixture of latex and organic solvent entering the stripping tower 10 through transfer line 18 has undergone sufficient agitation and contact with each other, e.g., average residence times of as much as 5, 10 or even 15 minutes to allow enough of the organic solvent to be absorbed into the polymer particles of the latex to cause appreciable swelling thereof. In some cases it is possible to achieve satisfactory results without mixing vessel 12 by merely injecting the organic solvent directly into the latex feed line 14 immediately upstream of the stripping tower 10.

USP 6403761 discloses a method for recovering a polymer efficiently from a polymer solution obtained by a solution polymerization is provided. By means of a method for recovering a polymer comprising heating a polymer solution obtained by a solution polymerization indirectly in a pipe to evaporate a solvent while forming a gas-liquid mixed phase flow or a gas-liquid-solid mixed phase flow followed by supplying the mixture to a recovery tank under pressure or under reduced pressure to separate the polymer from the solvent, the polymer can efficiently be separated from the solvent without changing the physical characteristics or the chemical characteristics of the polymer. When recovering a polymer from a polymer solution having a high viscosity, an infusion of water or steam serves to reduce the viscosity of the polymer solution and also to increase the linear velocity of a gas, whereby preventing the occlusion of a pipe and

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facilitating the operation.

The reference is based on the findings described above and can

be described as follows.

1. A method for recovering a polymer comprising heating a polymer solution obtained by a solution polymerization indirectly in a pipe to evaporate a solvent while forming a gas-liquid mixed phase flow or a gas-liquid-solid mixed phase flow followed by supplying the gas-liquid mixed phase flow or the gas-liquid-solid mixed phase flow into a recovery tank to recover the polymer.
2. A method for recovering a polymer according to 1 above, wherein water or steam is infused into the polymer solution in the pipe.
3. A method for recovering a polymer according to 2 above, wherein the amount of the water infused is 0.001 to 20 parts by mass based on 100 parts by mass as the solvent in the polymer solution.
4. A method for recovering a polymer according to 3 above, wherein the number-average molecular weight of the polymer in the polymer solution is 5,000 to 1,000,000.
5. A method for recovering a polymer according to 4 above, wherein the viscosity of the polymer solution is 0.001 to 300 Pa.multidot.s.
6. A method for recovering a polymer according to 5 above, wherein the concentration of the polymer in the polymer solution is 0.1 to 80% by mass.
7. A method for recovering a polymer according to 6 above, wherein the polymer is at least one selected from the group consisting of butadiene rubber, styrene-butadiene rubber, isoprene rubber, ethylene-propylene rubber, butyl rubber, styrene-butadiene copolymer, styrene-isoprene copolymer, butadiene block polymer, butadiene resin and acryl resin.
8. A method for recovering a polymer according to 7 above, wherein the linear velocity of a gas at the outlet of the pipe is 10 m/s or more.
9. A method for recovering a polymer according to 8 above, wherein the devolatilizing efficiency is 0.6 or less.
10. A method for recovering a polymer according to 2 above, wherein the amount of the steam infused is 0.001 to 30 parts by mass based on 100 parts by mass as the solvent in the polymer solution.
11. A method for recovering a polymer according to 10 above, wherein the number-average molecular weight of the polymer in the polymer solution is 5,000 to 1,000,000.
12. A method for recovering a polymer according to 11 above, wherein the viscosity of the polymer solution is 0.001 to 300 Pa.multidot.s.
13. A method for recovering a polymer according to 12 above, wherein the concentration of the polymer in the polymer solution is 0.1 to 80% by mass.
14. A method for recovering a polymer according to 13 above, wherein the polymer is at least one selected from the group consisting of butadiene rubber, styrene-butadiene rubber, isoprene

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rubber, ethylene-propylene rubber, butyl rubber, styrene-butadiene copolymer, styrene-isoprene copolymer, butadiene block polymer, butadiene resin and acryl resin.

15. A method for recovering a polymer according to 14 above, wherein the linear velocity of a gas at the outlet of the pipe is 10 m/s or more.

16. A method for recovering a polymer according to 15 above, wherein the devolatilizing efficiency is 0.6 or less.

17. A method for recovering a polymer according to 1 above, wherein further removing a residual solvent by supplying the polymer in the recovery tank to a devolatilizing extruder and molding of the desolvated polymer.

18. A method for recovering a polymer according to 17 above, wherein water or steam is infused into the polymer solution in the pipe.

Thus, the reference discloses a method for recovering a polymer of the reference comprises heating a polymer solution obtained by a solution polymerization indirectly in a pipe to evaporate a solvent while forming a gas-liquid mixed phase flow or a gas-liquid-solid mixed phase flow followed by supplying the mixture to a recovery tank to recover the polymer.

Water or steam also may be infused into a polymer solution in a pipe.

A polymer to which a method of the invention is applied may not be limited particularly as long as it is a polymer capable of being synthesized by a known solution polymerization. With regard to the preferable physical parameters of a polymer which can efficiently be recovered, the number-average molecular weight M_n is preferably 5,000 to 1,000,000, more preferably 20,000 to 800,000 and most preferably 50,000 to 500,000, and the viscosity of the polymer solution supplied is preferably 0.001 to 300 Pa·s, more preferably 0.005 to 200 Pa·s and most preferably 0.01 to 100 Pa·s. As a polymer there may be mentioned butadiene rubber, styrene-butadiene rubber, isoprene rubber, ethylene-propylene rubber, butyl rubber,

styrene-butadiene copolymer, styrene-isoprene copolymer, butadiene block polymer, butadiene resin, acrylic resin and the like. For an efficient operation without any occlusion of the pipe, the concentration of a polymer supplied is preferably 0.1 to 80% by mass, more preferably 1 to 50% by mass, most preferably 5 to 30% by mass.

The solvents used in the reference are not particularly restricted but may be toluene, xylene, n-hexane, cyclohexane, n-pentane, cyclopentane, iso pentane, n-heptane, cycloheptane, noctane, cyclooctane, n-decane, benzene dichloromethane and the like which is used in solution polymerization.

Fig.1

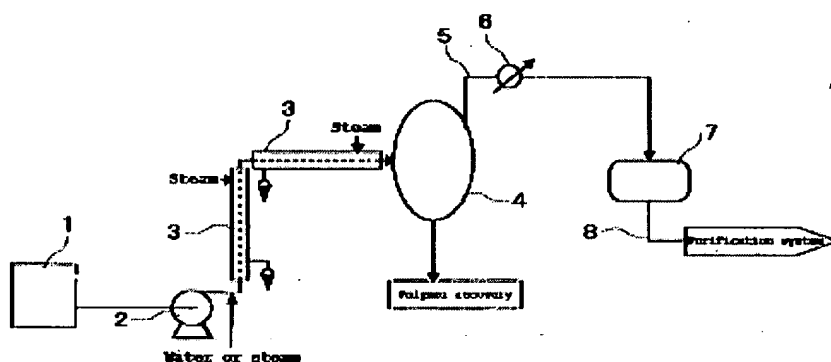


FIG. 1 is a schematic view of a system employed in Example 1. The system having the structure shown in FIG. 1 consists of intermediate tank or polymerization tank 1, volumetric pump 2, long tubular heater 3, recovery tank 4, first conduit 5, condenser 6, solvent tank 7 and second conduit 8.

The long tubular heater described above is that jacket is equipped with a

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cylindrical pipe and that can heat-exchange with the fluid in the pipe by flowing a heat medium such as a steam and the like. The long tubular heater can be used a double-pipe and that a long pipe is turned again and again in one shell.

A polymer solution obtained by a solution polymerization is pressurized by the volumetric pump 2 to be supplied from the intermediate tank or the polymerization tank to the long tubular heater 3. The long tubular heater 3 employs a heat exchange system consisting of a cylindrical pipe fitted with a jacket which is heated by a heating medium such as steam or the like, and the polymer solution entering the long tubular heater 3 receives the heat from the jacket and is heated to the boiling point of the solvent. When the boiling of the solution is initiated, the solvent is evaporated to increase the flow rate in the pipe, resulting in a turbulent flow in the pipe, which allows the heat to be transmitted at a high thermoconductivity, whereby evaporating the solvent. In this manner, a gradual boiling increases the flow rate, which drives the polymer to enter the recovery tank 4 without plugging in the pipe. Desolvated polymer which precipitates on the bottom of the recovery tank 4 is recovered here as a strand, granulated or powder-like crumb. From the top of the recovery tank 4, the evaporated solvent vapor comes out and passes through the first conduit 5 to enter the condenser 6, where it is cooled and liquefied, stored in the solvent tank 7, enters a purification system through the second conduit 8, and then is recovered after a purification.

A linear velocity of the effluent gas from the long tubular heater is

controlled by inner diameter of the pipe, temperature, polymer concentration, pressure of the recovery tank or the like, and is generally 10 m/s or more, preferably 20 m/s or more, more preferably 100 m/s or more, most preferably 200 m/s or more. Upper limit is generally 800 m/s. The faster linear velocity of the effluent gas results in prevention from a polymer degradation or the like during thermal treatment and an improvement in use of a steam when compared with a conventional steam stripping method. The linear velocity of the effluent gas of 10 m/s or less leads to a problematically reduced effect of occlusion in a pipe.

The linear velocity of the effluent gas under reduced pressure is preferably 100 to 200 m/s in condensation of the polymer solution, preferably 300 to 400 m/s in drying of the polymer. And the linear velocity of the effluent gas under pressure is preferably 20 to 100 m/s.

In addition, a devolatilizing extruder can be combined in the invention as shown in FIG. 2. The crumb in the recovery tank 4 is supplied directly to the devolatilizing extruder 9, and the residual solvent is devolatilized and released from the vent, after that the dissolved polymer is molded.

It is essential that a sample solution is pumped volumetrically into the long tubular heater 3 without occluding the pipe, and the volumetric pump 2 employed may for example be a gear pump, a diaphragm pump and a plunger pump, and the like.

The length of the long tubular heater 3 may vary to give a required

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calories, depending on the calorie exerted upon evaporation of the solvent of a polymer solution as well as the calorie given upon heating in the jacket and may for example be 5 to 200 m. The shape of the long tubular heater 3 may be linear, curved and spiral in order not to ensure the prevention of the occlusion of a pipe.

While the recovery tank 4 may be under pressure or under reduced pressure, it is preferably under reduced pressure. Under reduced pressure the large volume due to vaporization of the solvent makes a linear velocity of the effluent gas faster and the occlusion prevention with polymer deposited in a pipe. On the other hand, under pressure it is easy to operate a continuous outlet and handle it.

In order to ensure the occlusion prevention of a pipe, water or steam can be infused into a polymer solution into a pipe. By infusing water, the viscosity of the polymer solution can be reduced, and, in addition, the flow rate in the pipe can easily be increased as a result of the increase in the volume upon vaporization which is attributable to the small molecular weight of water. Furthermore, the foaming performance of a polymer recovered can be improved and the devolatilization performance can be improved. While a non-condensable compressed gas such as nitrogen or the like-instead of water or steam may also be infused, the presence of a non-condensable gas is disadvantageous in the subsequent condensation recovery of the solvent vapor. More preferably, a substance having a lower molecular weight is employed since a substance having a large molecular weight does not give a sufficiently

increased evaporation volume even if it is a condensable substance. Therefore, one infused preferably *is water or steam*. While the site where the infusion is effected is not particularly limited, it is preferably the inlet of the long tubular heater for the purpose of reducing the viscosity of a polymer solution as soon as possible.

Consequently, according to the reference, the polymer can efficiently be recovered without changing the physical characteristics or the chemical characteristics of the polymer. Especially when recovering a polymer from a polymer solution having a high viscosity, an infusion of water or steam serves to reduce the viscosity of the polymer solution and also to increase the flow rate in the pipe, whereby ensuring the prevention of the occlusion of a pipe and facilitating the operation. In addition, a substantial reduction in the steam consumption allows the operation to be accomplished at a lower cost.


Each of the references discloses a method for stripping solvent from a polymer solution prepared from the same components as claimed by applicants. In view of the above, there appears to be no significant difference between the reference(s) and that which is claimed by applicant(s). The apparatus as claimed is broadly defined and thus is anticipated by the drawings and language of Applicant's claims. Any differences not specifically mentioned appear to be conventional. Consequently, the claimed invention cannot be deemed as novel and accordingly is unpatentable.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terressa M. Boykin whose telephone number is 571 272-1069. The examiner can normally be reached on Monday-Thursday 10-5:30 Friday (work at home).

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Terressa M. Boykin
Primary Examiner
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